BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-I Computer Science & Engineering AI & ML : SUMMER : 2025
SUBJECT: PHYSICS FOR COMPUTING SYSTEMS

Day : Wednesday
Date : 14/05/2025

S-27615-2025

Time : 10:00 AM-01:00 PM
Max. Marks : 60

N.B.:

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagrams **wherever** necessary.
4) Use of non - programmable **calculator** is allowed.
5) Assume suitable data if **necessary.**

Q.1	a)	Draw a block diagram of CRT. Explain motion of electron in cross field.	(06)
	b)	Calculate velocity of Electron accelerated through potential difference of 30 KV. Mass of Electron = 9.1×10^{-31}kg.	(04)
		OR	
	a)	Explain construction and working of transmitting electron microscope. (TEM) with neat diagram.	(06)
	b)	Explain Bainbridge mass spectroscope.	(04)
Q.2	a)	Explain single slit diffraction and write condition for secondary maxima and minima.	(06)
	b)	White light falls normally on a soap film of thickness 0.51 micrometer and Refractive index 1.31 which wavelength in the visible region will be reflected most strongly.	(04)
		OR	
	a)	With suitable diagram explain formation of Newton's Ring in reflected light. Prove that the diameter of the n^{th} dark Ring is proportional to the square Root of natural number.	(06)
	b)	A plane transmitting grating having 6000 lines per centimeter. Gives an angle of diffraction of a 30^0 in 2^{st} order find the wavelength of the line.	(04)
Q.3	a)	With neat energy level diagram explain the construction and working of He-Ne laser.	(06)
	b)	Write applications of laser in different field.	(04)
		OR	
	a)	With neat labeled diagram explain construction and working of RUBY laser.	(06)
	b)	Distinguish between spontaneous and stimulated emissions.	(04)
Q.4	a)	Draw a suitable diagram and derive an expression for numerical aperture of a step index fibre.	(06)
	b)	Calculate the numerical aperture and acceptance angle of optical fiber of refractive index of core and cladding is 1.56 and 1.51.	(04)
		OR	
	a)	Give the name of different types of fibre. Describe schematically the basic element of optical fibre communication system.	(06)
	b)	A light ray entering optical fibre kept in water (R.I. = 1.33) of core refractive index 1.475 and cladding (R.I= 1.454) find acceptance angle and numerical aperture.	(04)

P.T.O.

Q.5 a) Derive Schrodinger time independent wave equation in one dimension (06)

b) Calculate the energy of neutron in eV whose de Broglie wavelength is 0.16 A^0. (04)

OR

a) Explain the de Broglie hypothesis. State Heisenberes uncertainty principle. (06)

b) What is wave length of beam of Neutron having energy 0.024 eV and mass 1.6768×10^{-27}kg? (04)

Q.6 a) What is Hall effect state its significance .How can mobility be determined by using Hall effect. (06)

b) Write application of Hall effect. (04)

OR

a) Explain Fermi level in intrinsic semiconductor. (06)

b) Draw energy band diagram of P-N junction in forward bias. (04)

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